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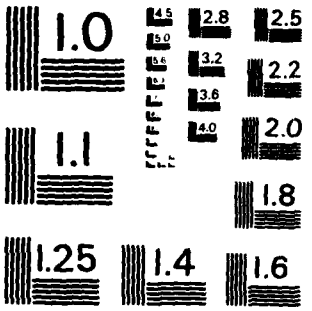

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FOREIGN TECHNOLOGY DIVISION

AN-32 TRANSPORTATION AIRCRAFT, USSR

by

T.M.

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An-32 TRANSPORTATION AIRCRAFT, USSR

T. M.

Design

All-metal twin-engine high-wing monoplane with turboprop propulsion.

Airfoil

Trapezoidal-rectangular outline, break at engine nacelles, leading edge step on joint of external and center section. Angle of wing setting 3°; external section anhedral -2°; sweep 6°50' at 25% of chord. Five-section, two-spar, semimonocoque design. Front spar situated at 17% of chord; rear spar at 55%. Longerons electrically spot-welded to skin. Integral fuel tanks situated in intermediate wing section torque boxes. Leading edge with deicing installation supplied with hot air from engine compressors. Nacelles and power plants fastened to center part of airfoil. In center section, single-slotted flaps take up 36% of the chord and on intermediate sections, two-slotted flaps take up the same percentage of the chord. Flap displacement: 15° for takeoff, 30° for landing. Spoilers are mounted on the upper surface of the airfoil in front of the flap: one on the center section and two on intermediate sections (each). Laminated two-section mass-balanced ailerons, two flaps on internal aileron sections (trimming and balancing tab). The wing constitutes a modification of the airfoil design of earlier Antonov aircraft.

Fuselage

Circular cross-section flattened at the bottom. Semimonocoque design (a modification of the fuselage of the An-26 aircraft). The bay takes up the entire internal length of the fuselage and is accessible by a door located in the rear part of the fuselage. The door is closed by a cover, which can be used as an entrance ramp; it can also be pushed below the fuselage (forward), which enables vehicles with cargo to come as close as possible (during mechanical loading). The bay is equipped with a floor conveyor facilitating displacement of cargo inside the aircraft (and in the rear part) with an overhead ceiling crane, making possible completely autonomous loading. The cargo bay can be easily adapted to transport passengers (39 people) or to a medical transport aircraft (24 people on stretchers plus medical personnel). The cargo bay has five windows and doors on the right side, behind the cockpit. The first left window in the cargo bay is also the emergency exit. The five-man crew cabin is practically identical to that in the An-26 aircraft. A dome-canopy shielding the navigator's window, providing good visibility in the entire left hemisphere, is situated on the left side behind the cockpit. Radioelectronic and navigation equipment units, the radar antenna, and the front landing gear recess are located in the front parts of the fuselage. Access to the equipment is ensured by a hatch closed by a cover on the left side of the fuselage in front of the crew's cabin.

Control Surfaces

Classical system of control surfaces. Elevator unit and vertical tail unit outlines are trapezoidal. Elevator displacement 9°. Semimonocoque two-spar design. Flaps on tailplane over the entire span. Leading edges equipped with deicing installations and supplied with hot air from engine compressors. Control surfaces (metallic design) equipped with trimming tabs. The control surfaces are complemented by two stabilizing fins below the rear part of the fuselage. The latter are considerably larger compared with the An-26 aircraft.

Controls

Dual controls (control wheel and pedals). Combined cable-pushrod-lever control of ailerons, rudder, and elevator, with hydraulic intensifiers. Flaps,

spoilers, and landing gear controlled hydraulically.

Landing Gear

Tricycle landing gear retracted and released hydraulically. The front landing gear is retracted into the hatch in the front part of the fuselage and the main landing gear is retracted into hatches in the engine nacelles. Double wheels on front and main landing gear, with dimensions: front wheels, 0.700 X 0.250 m; main wheels, 0.900 X 0.300 m. Pressure can be regulated (depending on type of landing surface) in the range 0.25 to 0.49 megapascal (= 2.5 to 3.5 kg/cm^2) for front wheels, and in the range 0.34 to 0.49 megapascal (= 3.5 to 5.0 kg/cm^2) for the main wheels. The wheels of the main landing gear are equipped with hydraulic disk brakes. The front landing gear is controlled hydraulically. Emergency release of landing gear (gravitational, using air pressure for interlocking main landing gear on locks). The landing gear is identical to that in earlier versions of An-24 and An-26 aircraft.

Propulsion Unit

Two Ivchenko AI-20M turboprop engines, takeoff power 3820 kW (5200 hp) each. Four-blade metallic self-adjustable propellers with capability of setting in feathering (propeller diameter 4.70 m). Engines built-in above wings. Leading edge of blades, propeller spinners, and air intakes to engines are equipped with deicing installations. Single-engine exhausts are situated above the wings.

Installation

Fuel installation--wing-integral tanks in intermediate wing sections, total capacity 4200 liters. Automatic control engineering from engines. Hydraulic installation, working pressure 15.2 megapascal (= 155 kg/cm^2), main pumps on engines, emergency electric pump. Hydraulic installation is used for releasing and retracting landing gear, controlling front landing gear, wheel brakes of main landing gear, flaps and spoilers. The installation also drives the loading ramp, crane, and conveyor mechanisms and the front window wipers, and it is also used for emergency adjustment of propellers during feathering. Electric installation: generators with converters on engines, direct current 28.5 V, alternating current 115 V/400 Hz and 36 V/400 Hz. The installation is

used for external and internal illumination of the aircraft, supply of equipment and instruments on board, and of the propeller deicing installation. Two types of deicing installations: leading edge of wings and stabilizers and air intakes of engines heated by hot air from engine compressors, spinners and leading edges of propellers heated electrically. Air conditioning installation: ensures pressure equal to pressure at sea level, to 2800 m flight altitude and above this altitude, constant positive gauge pressure; it also regulates the air temperature in the bay and the crew's cabin. This installation is supplied from engine compressors. Oxygen installation, constitutes a safety backup in the event of cabin depressurization.

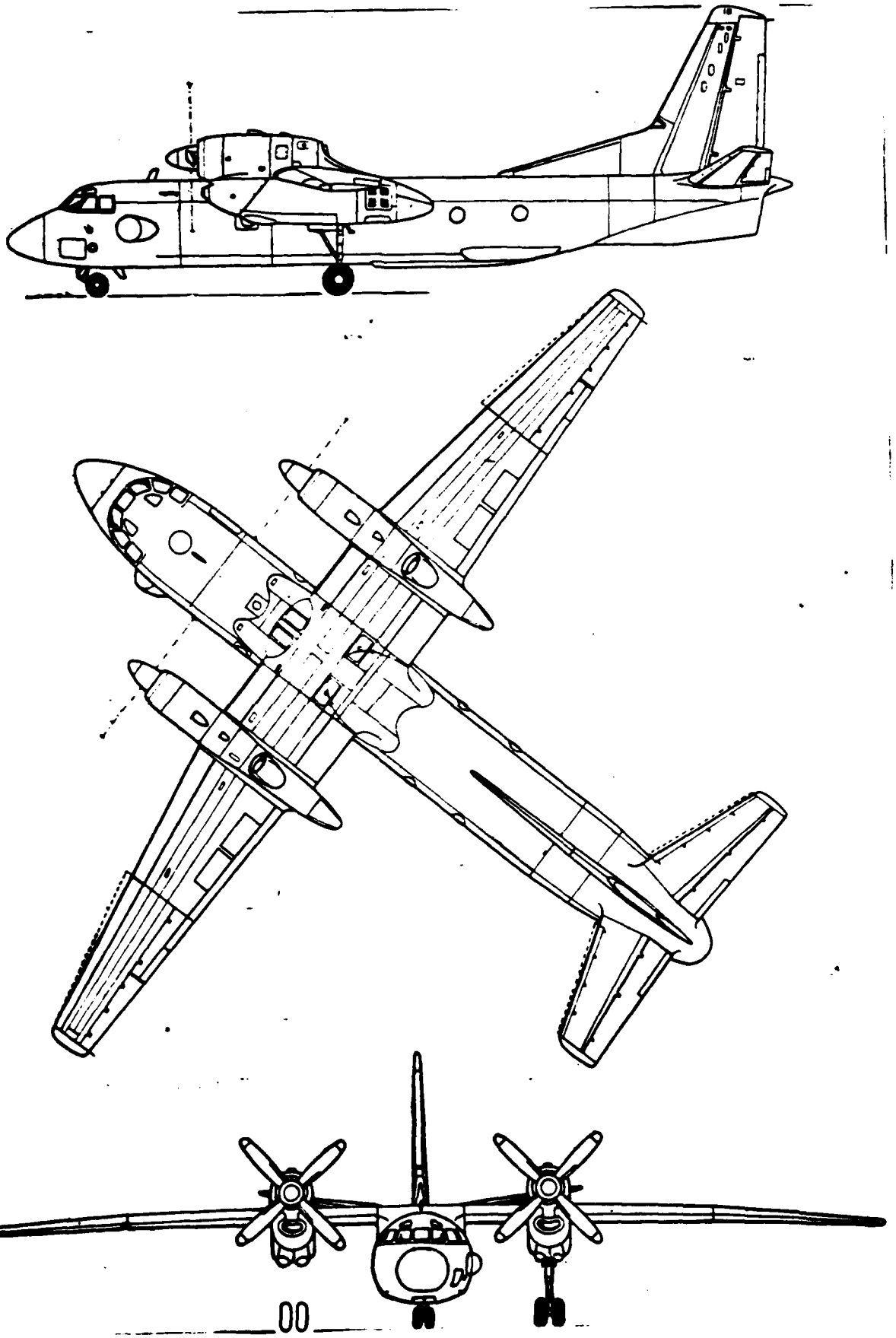
Equipment. Meteorological radar, autopilot, complete set of equipment for flights under different atmospheric conditons. A set of instruments similar to that in An-26 aircraft and similar communications equipment. The floor in the bay is equipped with a hydraulically driven conveyor, which allows to move cargo with mass up to 4500 kg. Overhead ceiling crane, lifting capacity 1500 kg, situated above the cargo door in rear part of fuselage.

Development of Design

An-32 is the current developmental version of the well-known family of passenger and transportation aircraft designed by Oleg Antonov (An-24, An-26, and An-30). The prototype of the entire family, An-24, was test-flown on 20 December 1959. An-32 was demonstrated for the first time at the International Air and Aeronautics Show in Paris, in 1977. The basic difference, compared to earlier versions, is the use of engines with considerably greater power (about 80%). The latter makes it possible to use the aircraft while retaining proper performance in airfields situated in high mountains and in tropical climate zones. The reason why the engines are situated above the wing is to protect them from dust and dirt entrained from the ground. The purpose of the aerodynamic changes in the wing (use of spoilers) is also to improve the performance of the aircraft in the takeoff and landing phase. The purpose of the larger stabilizing fins (below the control surfaces) is to increase directional stability in the event of failure of one engine.

Technical Data

Span	29.20 m	Maximum takeoff mass	26,000 kg
Length	23.80 m	Maximum lifting surface load	346.8 kg/m^2
Height	8.58 m	Maximum power load	3.4 kg/kW (= 2.5 kg/hp)
Tailplane span	9.97 m_2		
Lifting surface	74.98 m^2	Cross-country flight velocity	510 km/h
Aspect ratio	12.85	Ceiling	9500 m
Mass of empty aircraft	16,600 kg	Ceiling on one engine	5000 m
Maximum payload mass	6,000 kg	Maximum range	2200 km
		Range with maximum payload	800 km
		Crew	Five people



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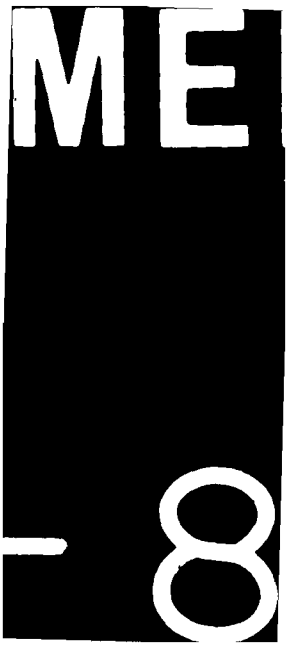
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